

CLAIM AMENDMENTS

The amendments made to the claims are shown below in the prescribed manner, including the current disposition of all claims.

1. (currently amended) An electrochemical cell comprising
an anode compartment,
an anode located in the anode compartment,
an anolyte comprising an aqueous acidic metal plating solution
containing an organic contaminant and a metal ion,
a pump for circulating the anolyte through the anode compartment,
a cathode compartment,
a cathode located in the cathode compartment,
a catholyte ,
a pump for circulating the catholyte through the cathode compartment,
a separator between the anode and the cathode, comprising an ionically
conducting solid polymer membrane material, and
a power supply for supplying dc current to the cell,
wherein the anode includes an active material which is stable at acid pH and at
high electrical potential, and which selectively breaks down organic compounds
by electrochemical oxidation, and wherein the separator ~~preferentially allows~~
~~the passage of proteins over other ions~~ minimizes the loss of metal ions from
the anolyte.
2. (original) An electrochemical cell according to Claim 1, wherein the
anode active material is in the form of a solid material, or a coating of active
material on a solid substrate.
3. (original) An electrochemical cell according to Claim 2, wherein the solid
material or solid substrate is a high surface area material.

4. (original) An electrochemical cell according to Claim 3, wherein the solid substrate is a metal substrate.
5. (original) An electrochemical cell according to Claim 4, wherein the active material coating comprises tin dioxide, lead dioxide or platinum based materials.
6. (original) An electrochemical cell according to Claim 5, wherein the metal substrate is titanium.
7. (original) An electrochemical cell according to Claim 1, wherein the cathode is of a material selected from the group consisting of stainless steel and titanium, which may include an oxide layer, glassy carbon and platinum based materials.
8. (currently amended) An electrochemical cell according to Claim 1 wherein the separator is a cation exchange membrane, which preferentially allows the passage of protons over other ions.
9. ¹² (original) An electrochemical cell according to Claim 1, wherein the separator is a bipolar membrane.
10. (original) An electrochemical cell according to Claim 1, wherein the separator is a perfluorinated cation membrane.
11. (original) An electrochemical cell according to Claim 1, wherein the separator is a monovalent cation selective membrane selected from polystyrene monovalent and polysulfone monovalent membranes.
12. ⁹ (currently amended) An electrochemical cell according to Claim 4 8, wherein the catholyte comprises an aqueous acidic solution ~~An electrochemical~~

~~cell according to Claim 12~~, wherein the catholyte is of a lower ionic strength than that of the anolyte.

13. (currently amended) An electrochemical cell according to Claim 12 1, ~~wherein the anolyte additionally comprises a metal ion, and~~ wherein the cell additionally comprises a metal removal and return unit, for removing metal and/or metal ions from the catholyte.

14. (currently amended) An electrochemical cell according to Claim 13, wherein the ~~metal ion is in a metal plating bath~~ solution is selected from copper, tin and zinc plating baths.

15. (currently amended) A process for electrochemically reducing the amount of an organic contaminant in an aqueous metal plating solution containing such contaminant, comprising

(a) providing an electrochemical cell, the electrochemical cell comprising

an anode compartment,

an anode located in the anode compartment,

an anolyte comprising an aqueous acidic liquid ~~mixture~~ metal plating solution containing an organic contaminant and a metal ion,

a first pump for circulating the anolyte through the anode compartment,

a cathode compartment,

a cathode located in the cathode compartment,

a catholyte ,

a second pump for circulating the catholyte through the cathode compartment,

~~a separator~~ between the anode and the cathode, comprising an ionically conducting solid polymer membrane material, and

a power supply for supplying dc current to the cell,

wherein the anode includes an active material which is stable at acid pH and at high electrical potential, and which selectively breaks down organic compounds

by electrochemical oxidation, and wherein the separator ~~preferentially allows the passage of protons over other ions~~ minimizes the loss of metal ions from the anolyte,

- (b) activating the dc power supply to provide electrical current to the cell,
- (c) activating the first pump to circulate the anolyte through the anode compartment to expose the ~~liquid mixture~~ aqueous solution to the anode to selectively break down the organic contaminant by electrochemical oxidation,
- (d) activating the second pump to circulate the catholyte through the cathode compartment, and
- (e) removing the aqueous metal plating solution having a reduced amount organic contaminant from the anode compartment.

16. (original) A process according to Claim 15, wherein the anode current density is in the range of 1-200 mA/cm².

17. (original) A process according to Claim 16, wherein the anode current density is in the range of 10-75 mA/cm².

18. (currently amended) A process according to Claim 15, wherein the catholyte comprises an aqueous acidic solution, and wherein the ionic strength of the catholyte solution is adjusted to provide a lower ionic strength than that of the anolyte to balance the water flux through the membrane.

19. (currently amended) A process according to Claim 18, wherein the ~~aqueous solution includes a~~ metal ion, is selected from the group consisting of copper, zinc and tin.

20. (original) A process according to Claim 19, additionally comprising removing the catholyte to remove metal and/or metal ions therefrom and returning the catholyte to the cell.
21. (original) A process according to Claim 15, wherein the anode material is a stable substrate coated with an active layer of platinum based material.
22. (currently amended) A process according to Claim 15, wherein the anode material is a high surface area predominately platinum coated anode run at a low current density (i.e. below 10 mA/cm^2 and preferably below 2 mA/cm^2).
23. ²⁴ (currently amended) A process according to Claim 15, wherein the separator is a bipolar membrane, and wherein the current density through the membrane provided by the power supply is kept below the threshold for metal precipitation.
24. (cancelled) A process according to Claim 15, wherein the separator is a cation membrane, and wherein the ionic strength is adjusted to balance the water flux through the membrane.
25. (original) A process according to Claim ¹⁸ 24, wherein metal deposits on the cathode are removed without cell disassembly by periodic anodic polarisation versus an additional electrode external to the electrochemical cell.
26. (original) A process according to Claim ¹⁸ 24, wherein the cathode is an oxide forming metal or glassy carbon to which metals deposits are poorly adherent.
27. (original) A process according to Claim ¹⁸ 24, wherein the poorly adherent metal deposits on the cathode are removed without cell disassembly by

periodic application of ultrasound and collection of the metal particles from the catholyte flow.

18
28. (original) A process according to Claim 24, wherein the poorly adherent metal deposits on the cathode are dislodged by masking areas of the cathode to produce local high current densities which result in loose, fluffy, poorly adherent metal deposits which can be detached by the catholyte flow and the high local rate of gas evolution.

18
29. (original) A process according to Claim 24, wherein metal deposits on the cathode are removed without cell disassembly by periodic recirculating of a metal stripping solution such as diluted nitric acid or hydrogen peroxide.

23
30. (new) A process according to Claim 22, wherein the current density is below 2mA/cm^2 .

30
31. (new) A process according to Claim 15, wherein prior to step (b), the contaminated metal plating solution is transferred to the anode compartment from a metal plating operation.

30
32. (new) A process according to Claim 31, wherein the process is a continuous process.